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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,467	11/29/2001	Koji Sato	85A 3169	5684

7590 06/19/2002

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EXAMINER

LEWIS, MONICA

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 06/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/998,467

Applicant(s)

SATO, KOJI

Examiner

Monica Lewis

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

1. This action is in response to the application filed November 29, 2001.

***Election/Restrictions***

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-4, drawn to a semiconductor structure in which bumps are formed on a surface of a chip and leads face other, classified in class 257, subclass 673.
  - II. Claims 5-7, drawn to the method for manufacturing a semiconductor structure in which bumps are formed on a surface of a chip and leads face other, classified in class 438, subclass 106.

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

A telephone conversation took place with William L. Androlla on June 6, 2002 which resulted in a provisional election being made with traverse to prosecute the semiconductor structure in which bumps are formed on a surface of a chip and leads face other, claims 1-4. Affirmation of this election must be made by applicant in replying to this Office action. Claims 5-7 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Drawings***

3. Figures 7-10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

5. The disclosure is objected to because of the following: a) "Summary of the Invention" appears to be a spelling error (See Page 2); and b) Figures 7-9 are not described as conventional or prior art in the "Brief Description of the Drawings" (See Pages 4 and 5).

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4 are rejected under 35 U.S.C. 103(a) as obvious over Barber (U.S. Patent No. 4,701,363) in view of Kleffner et al. (U.S. Patent No. 5,943,597).

In regards to claim 1, Barber discloses the following:

a) each of said leads (17) is provided with a projection being formed with guided surfaces that are inclined surfaces (See Figure 7).

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In regards to claim 1, Barber fails to disclose the following:

a) each one said bumps is provided with a recess in a surface thereof that faces each of said leads, the recess comprising guide surfaces that are inclined surfaces and are formed between a bottom of said recess and opening edges of said recess.

However, Kleffner et al. ("Kleffner") discloses a bump (22) located within a recess (See Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Barber to include a bump located within a recess as disclosed in Kleffner because it aids in reducing thermal and mechanical stress.

In regards to claim 2, Barber fails to disclose the following:

a) guide surfaces are formed for an entire periphery of said recess of said each one of said bumps, and said guided surfaces are formed so as to surround a bonding point of said lead.

However, Kleffner discloses a bump located within a recess (See Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Barber to include a bump located within a recess as disclosed in Kleffner because it aids in reducing thermal and mechanical stress.

In regards to claims 3 and 4, Barber discloses the following:

a) a width of an end surface of each of said leads that faces a bump (24) is narrower than a width of said lead (See Figure 2).

### ***Conclusion***

8. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: a) Perrino (U.S. Patent No. 3,868,724) discloses a multi-layer connecting structure for packaging semiconductor devices; b) Mones et al. (U.S. Patent No. 4,273,859) discloses a method of forming solder bump terminals on semiconductor elements; c) Gansauge et


al. (U.S. Patent No. 5,010,389) discloses an integrated circuit substrate with contacts; d) Agarwala et al. (U.S. Patent No. 5,268,072) discloses an etching process for avoiding edge stress; f) Akram (U.S. Patent No. 5,736,456) discloses a method of forming conductive bumps on a die; g) Mitchell et al. (U.S. Patent No. 5,773,359) discloses an interconnect system and method of fabrication; h) Takahashi et al. (U.S. Patent No. 5,900,671) discloses an electronic component connected to an electrode; i) Andricacos et al. (U.S. Patent No. 5,937,320) discloses barrier layers for electroplated solder joints.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703-308-4940. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

June 13, 2002

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
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